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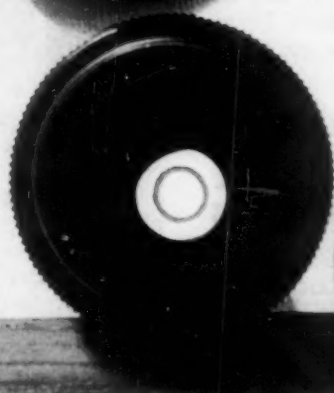
TECHNOLOGY DEPT

November 14, 1953

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# SCIENCE NEWS LETTER

THE WEEKLY SUMMARY OF CURRENT SCIENCE



Prize-Winning Ring

See Page 307

A SCIENCE SERVICE PUBLICATION

# What General Electric people are saying . . .

## I. TONKS

*Dr. Tonks is Manager—  
Physics Section—Knolls Atomic Power  
Laboratory*

For several years we have been operating a reactor which is serving not as a prototype or a direct source of power-reactor performance information but as an auxiliary in such a program—much as a cathode ray tube can be useful in testing television sets. We had experienced the limitations of a Ra-Be source in a graphite pile and foresaw that an experimental thermal reactor could serve as a very valuable tool. Purely as a substitute for the graphite pile, it could easily give us many more neutrons even at low power. Thus, activation experiments either for weighing absorbing foils or fuel itself could be carried out more rapidly. It became reasonable to think that with sufficient intensity and using a chopper we might make actual differential cross-section measurements, and a certain type of exponential experiment in fissionable material became a possibility. Finally, the criticality condition in a reactor makes it suitable for neutron absorption measurements by observing the effect of the material under test on reactivity.

These were the considerations that led us to build our first thermal test reactor based on the fundamental design of Dr. Steward of this Laboratory . . .

Our thermal test reactor has undergone a logical evolution in accordance with its proved usefulness. From a small beginning with a power level of one watt, all-manual controls, makeshift shielding and borrowed fuel, it has justified development into the 10,000-times-more powerful reactor we are about to complete. It is still small as reactors go and yet can give thermal neutron fluxes for experimental purposes which are comparable with far larger units. And by exploiting danger coefficient techniques it can measure thermal capture cross sections of small samples and weigh isotopes.

*at the American Physical Society,  
Rochester, N. Y.*

## E. J. LAWTON

*Mr. Lawton is with X-Ray Research,  
Electron Physics Research Department,  
General Electric Research Laboratory*

We have recently found that certain polymers, or plastic materials are cross-linked or "cured" when bombarded with high-velocity electrons. This curing process cross-links, or ties together, the long chain-like molecules that make up the plastic material. Some of the properties of this cross-linked material are greater form stability at high temperatures and improved solvent resistance. For example, consider polyethylene bottles or containers (squeeze bottles). These, as you might expect, will collapse if subjected to high temperatures. A short time electron bombardment of such a bottle, however, will change its characteristics so much that it can stand up under steam sterilization. You can start an almost endless list of applications with sterile but unbreakable containers for pharmaceutical and biological materials which require sterilization after packaging. Unbreakable, re-usable milk bottles can be another possible use. Other plastic materials that can be cross-linked by the electron beam are nylon, rubber, and silicone products.

In some of our earlier work we found that certain liquid materials would polymerize to solid plastics when exposed to the electron beam. In this process, there is a joining together of many smaller molecules to form the long chain-like molecules that make up the solid plastic. This means of initiating polymerization does not necessitate the use of catalyst and high temperature that is required in the conventional chemical polymerization process. In fact, we found that polymerization could be initiated at temperatures as low

as about 100° Fahrenheit below zero. Further, by controlling the pattern of the electron beam, it was found that specific solid plastic shapes could be produced in the liquid, thus providing a new and interesting way of casting objects.

*General Electric Science Forum  
WGY, Schenectady, N. Y.*

## C. A. BURKHARD

*Dr. Burkhard is a Research Associate at  
the General Electric Research Laboratory.*

When one desires to find information concerning a field or particular compound he is confronted with the problem of consulting abstract journals, books or files to find the data which he desires. It is possible by use of either hand-sort or machine-cards and equipment to prepare technical libraries which will have available files of information pertaining to the entire field of science. Then one confronted with the task of making a survey of a given field could consult such a library, and, by making the proper sorts by hand or by machine, obtain (1) a list of references pertaining to the subject in question (2) obtain pertinent data concerning the subject. As an ultimate in this type of activity it would be possible with the machine sort cards to rapidly prepare printed sheets of references, lists of compounds and their physical properties, or lists of materials having certain physical properties. By the use of such type files it would also be possible to correlate and analyze data pertaining to particular research and development problems from time to time without requiring the necessity of using research personnel to conduct such surveys.

*at the American Chemical Society  
Chicago, Ill.*

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## PHYSICS

# Nobel Prizes Awarded

Dr. Hermann Staudinger wins Nobel Prize in chemistry for his work on high polymers. Dr. F. Zernike awarded Nobel Prize in physics for his development of the phase microscope.

## See Front Cover

► **BETTER UNDERSTANDING** of how cancer cells grow, by allowing scientists to spy upon living body cells in color as they carry on their important life functions, is resulting from the pioneering studies of Dr. F. Zernike, the Dutch physicist who won this year's Nobel Prize in physics.

The new technique of "color staining" living cells by light waves without killing the cells is Dr. Zernike's most recent refinement of the phase microscope, which he visualized and developed about 20 years ago.

Dr. Zernike, professor of physics at the University of Groningen, the Netherlands, since 1920, was visiting professor in physics at the Johns Hopkins University in Baltimore in 1948. He participated in a symposium on optics at the National Bureau of Standards in October, 1951.

The ordinary phase microscope uses two transparent rings to reveal, in black and white, previously unknown details concerning delicate cell structure. Two optical companies—Bausch & Lomb Optical Co.

and American Optical Company—now make instruments of this type in the United States. Only a few phase microscopes that work in color are being used in experimental work in this country at the present time.

In the black and white phase microscope, a ring separates a small portion of light and distributes it over the whole field of view of the microscope, taking advantage of the fact that light travels in waves. This separated light, spread over the whole image, gives an evenly illuminated background.

The image of the cell being viewed appears bright where the phase of the direct light used for viewing is the same as that of the background light, so that the two light beams reinforce each other. It shows dark when the phases of the two light beams are different, so that by interference they nullify each other.

Rings such as the one shown on the cover of this week's SCIENCE NEWS LETTER cause details in transparent objects to stand out in marked contrast in Dr. Zernike's phase microscope.

In the phase microscope by which cells can be seen in color, the ring that separates the light works in an opposite way in the red end of the spectrum than it does in the green end. Thus it gives some details more red light, some more green, depending on their thickness, enabling scientists to see the living cell in color.

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## CHEMISTRY

## Nobel Pioneer in Chemistry of Synthetics

► **THOSE WONDERFUL** synthetic fibers, plastics and rubbers that play such an important role in the modern world owe their existence in large measure to the German chemist, Dr. Hermann Staudinger of the University of Freiburg, who has been awarded the 1953 Nobel Prize in chemistry for researches that began over three decades ago.

Pioneering in what has become known as high polymer chemistry, Dr. Staudinger is credited with establishing that the molecules of the synthetics like nylon have their atoms in long chains. Either by natural processes or by the skill of the chemist's reactions, big molecules are made out of little ones by a process called polymerization. This is fundamental to many fields of industrial chemistry today, with products that gross many millions of dollars.



**DR. HERMANN STAUDINGER**—Winner of the Nobel Prize in chemistry for 1953 is Dr. Hermann Staudinger, whose work laid the foundation for macro-molecular chemistry, basis of synthetic fibers, plastics and rubbers.

Hardly any scientific compilation on polymers in the years since World War I has failed to give references to the fundamental work of Dr. Staudinger and a host of fellow workers. Some American chemists between the two world wars studied in his laboratories.

A relationship between molecular weight and viscosity was discovered by Dr. Staudinger in 1930 and aided in the development of the new synthetics.

Molecules of the high polymers are composed of 2,000 or more atoms. The way the molecules regiment themselves determines the differences between springy rubber, hard plastic and tough fiber. Natural substances such as cellulose, starch, proteins, chitin and rubber also have the long-chain structure.

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## PALEONTOLOGY

## Museum Gets Spider 250,000,000 Years Old

► **A RARE** 250,000,000-year-old spider of the hypochilid family has been added to the collection of the American Museum of Natural History in New York. The spider was one of 45,353 specimens of nocturnal spiders, beetles and moths collected by three Museum expeditions this summer.

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Permanent magnets made of ceramic material have recently been produced.

The earth would look 80 times as bright from the moon as the moon does from the earth.



**DR. F. ZERNIKE**—Awarded the Nobel Prize in physics for 1953, Dr. Zernike visualized and made the first phase microscope about 20 years ago, recently refined it to allow study of living cells in color.



## INVENTION

# Space-Saving Machine

► U. S. PATENT Office officials now are creating a "space-saving device" to solve their acute filing problem. They report, however, no plans to get a patent on their machine.

The space saver will be too specialized in its work to merit a patent, reports T. B. Morrow, Patent Office executive officer.

By 1955 all patent-storage space in the vast underground three-acre file room will be exhausted. Patent officials have two choices:

1. They can expand their files—a costly procedure in the eyes of nimble-scissored budget trimmers.

2. They can microfilm about 250,000 patents, install a \$130,000 reproducing machine and, in five years, cut expenditures for filing equipment and printing by as much as \$70,000 above the machine's cost.

Patent officials are excited over the possibilities offered by the latter choice.

In plan, the machine will microfilm the first 250,000 patents granted by the Patent Office. This will compress on 1,400 feet of film enough patents to extend the files another five years. By the end of that time, more patents can be microfilmed to extend the files another five years.

Made up of electrical assemblies already proven, the machine will be able to scan as many as 1,000,000 patents a day on micro-

film. It will be able to select automatically and reproduce about 1,000 patents a day. This is more than adequate since requests for the old patents are comparatively few.

The machine's economic advantages become vivid when it is considered what must be done if the Patent Office has to expand its files. This would entail renting or constructing more storage space, either of which would be costly.

The storage space would have to be filled with steel files to house the patents. These files are specially designed for the purpose. They are divided into inch-wide slots, 50 slots to a row and 10 rows tall on both sides. The file slots are arranged according to a decimal system to make it easy to file and pull patents. Steel files to handle one year's normal issue of 40,000 patents cost \$25,000.

Increasing the file space also means increasing personnel to handle the patent copies. One patent puller working at top speed can only draw about 1,000 patents a day from the files. Normal draw, at present, is 20,000 patent copies a day.

Since the machine will make photo copies of patents ordered, the Patent Office's printing bill will be cut. It costs about \$15,000 a year merely to replenish the printed supply of old patents that becomes exhausted in the group to be microfilmed.

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## VETERINARY MEDICINE

# Disease Prevention Studies

► A METHOD of experimentally producing erysipelas, the nation's number two swine killer, will help solve the problem of controlling the disease.

A scarification of the skin method, which produces the disease in selected hogs, has been developed by Dr. R. D. Shuman of the Bureau of Animal Industry, U. S. Department of Agriculture. It is similar to a smallpox vaccination for human beings.

Tests of an experimental vaccine for erysipelas have been greatly handicapped by the lack of a means of producing the disease. Hogs were vaccinated in field tests, but scientists were unable to determine definitely if the animal had been immunized.

The scarification method makes it possible to determine a hog's immunity or susceptibility to the disease. For the first time, it is possible to measure the degree and length of immunity produced by vaccination. Experiments have indicated that sows should be vaccinated before breeding, and baby pigs at weaning age.

As yet veterinary scientists have been unable to determine how swine get the disease. The American Veterinary Medical Association has suggested that the new method may be used to trace the complete history of the infection.

Erysipelas is caused by a bacterium. In the acute septicemic stage, it is frequently fatal and its symptoms are similar to hog cholera. One form of the chronic disease is akin to arthritis, with lameness and swollen joints. A skin form is frequently called the diamond-skin disease because of the red diamond-shaped patches that form on the skin.

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## PHYSIOLOGY

# Body's Natural Defense Against Cold Studied

► TO PROVIDE better evaluation and treatment of injuries resulting from exposure, the human body's natural defenses against cold are being investigated.

Dr. Alan Hemingway of the University of California at Los Angeles is performing the study under a grant from the U. S. Air Force.

Cold defense mechanisms include: 1. shivering, 2. constriction of certain blood vessels near the skin's surface to reduce heat loss, and 3. increased activity of certain hormones, which produces additional heat.

Particular emphasis has been placed upon

studying the body's temperature-regulating mechanism in the brain. This is located in the hypothalamus and controls shivering.

In animal studies, it was found that an electrical stimulus of a certain area of the hypothalamus stopped shivering suddenly. In actual practice, shivering is initiated when sensory nerves react to cold exposure. A sudden emergency involving self defense or flight may call for use of muscles involved in shivering, and thus "turn off" the shivering.

The practical value of the research is related to problems of cold encountered by airplane pilots.

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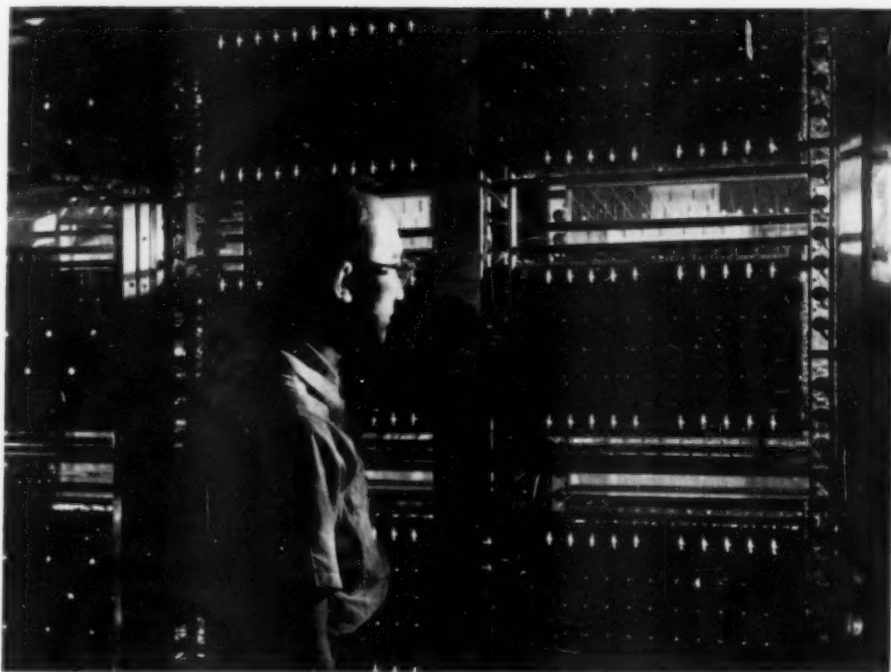
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**"BRAIN" AT WORK**—A giant electronic computer, such as the ORACLE shown here, will be helping weather forecasters make predictions on a trial run within a year. J. C. Chu of Argonne National Laboratory is shown here illuminated by the light of the computer's 2,000 electronic tubes.

## METEOROLOGY

## Weather by Giant "Brain"

Plans now made for daily use of electronic computer as an aid in predicting weather. Wind charts drawn with its data will be sent experimentally to local forecasters.

► A GIANT electronic "brain" will be making daily wind predictions to be used for local weather forecasts, on an experimental basis, within a year, according to plans of the nation's top weather experts in Washington.

Official announcement of plans for the first day-by-day use of an electronic computer in a trial run on weather forecasting is expected in 1954. The experimental program, planned eventually to give more accurate weather forecasts, will be jointly run by the Navy, Air Force and Weather Bureau.

Using electronic computers is a revolutionary method in numerical weather prediction, pioneered at the Institute for Advanced Study, Princeton, N. J. The system is so new that there are comparatively few experts on it in the world. Yet it is so promising that government weather officials have completed plans for its trial, and need only the necessary funds to start the program.

During its operations, the computer will be fed information on air pressures at several levels in the atmosphere, from near the

ground to about 30,000 feet. It will then perform mathematical calculations on this information and come up, within an hour, with the figures from which nation-wide upper wind charts can be drawn.

These wind charts, needed in predicting weather patterns over the entire country, will be sent to local forecasters. With this nation-wide picture as a background, the weathermen will then apply their specialized knowledge of local weather conditions to make their 24-hour prediction.

In making forecasts at the present time, weathermen rely heavily on the skill and knowledge they have acquired, during years of practice, to make their predictions as accurate as possible. With a picture of today's weather, they have to jump immediately from that to their own estimation of what to expect in 24 hours, or five or 30 days. Thus, essentially, weather prediction is an art, based on certain physical principles, but varying with the forecaster's personal judgment resulting from his experience.

In the trial run with an electronic computer for making the wind charts, most, if

not all, of the forecaster's subjective judgments concerning winds will be eliminated, although he will still have to make subjective decisions to go from the wind charts to actual weather forecasts.

One numerical forecasting expert now foresees that high speed "brains" will eventually eliminate most of the forecaster's personal opinions from his predictions. The techniques needed to record automatically the required weather data, to send such information to a giant computer, and to retransmit a finished weather map to local forecasters are now available, or are expected to result within several years from such programs as the one now being launched.

At present, numerical forecasting works like this: Information on current weather conditions across the country is fed into the computer. Stored in the computer's "memory" are certain mathematical formulas describing the motions of great air masses. Using these formulas, the "brain" computes the winds one hour in the "future." Then, working in one-hour jumps, these forecasts are repeated until, finally, a picture of the winds 24 hours in advance of the "present" is obtained.

One computer can now perform the millions of steps necessary to make such a 24-hour prediction in somewhat less than an hour.

With the use of formulas not yet completely worked out, which would take into account such energy sources as variations in the heat received from the sun and those resulting from water evaporation and condensation, meteorologists hope eventually to be able to use computing machines to make numerical weather forecasts for five or 30 days, or perhaps even farther into the future. Such long-range predictions, however, are not expected very soon.

Experts in numerical forecasting believe this system has two advantages over present methods:

1. The computer can use and store in its "memory" many hundred times the information a human forecaster can possibly keep in his head.

2. A human forecaster cannot use a precise, step-by-step, hour-by-hour method and stay ahead of the weather. He has to jump directly to the desired future time by subjective methods. Step-like predictions are more accurate than such relatively long-time jumps.

Which of the electronic computers now operating in the country would be the most satisfactory for numerical forecasting purposes is a question representatives of the Weather Bureau, Air Force and Navy still have to settle.

With this question answered, and with the necessary funds made available, the program will be put in operation. Then top meteorologists throughout the world will watch with high interest to see how weather predictions, made with the aid of computers, compare with the actual sunny or stormy conditions that mean either blue skies or rubbers.



## PHYSICS

# Atom Smasher "Cheats"

**"Swindletron" gives protons two boosts of energy with each electrical impulse, instead of just one kick. It operates at lower voltages than the giant accelerators.**

► A "SWINDLETRON," a new kind of atom smasher that seems to "cheat" on an elementary law of physics, is being developed at the University of California.

Heretofore, the machines that physicists have built for smashing atoms have given only one boost of energy to atomic projectiles by a single electrical impulse. The "swindletron" gives two boosts of energy per electrical impulse.

The "swindletron" can operate in the region of several million electron volts, but cannot rival in energy the big cyclotrons, cosmotrons and bevatrons. However, scientists say it will operate cheaper, easier and more safely in the energy ranges now covered by Cockcroft-Walton and Van de Graaff atom smashers.

In the Berkeley pilot model "swindletron," more formally called the charge exchange accelerator, protons, the nuclei of hydrogen atoms, are used as atomic bullets.

The protons are shot at about 30,000 volts through a thin, uncharged sheet of aluminum. In this "capture" foil, the slow-moving protons tend to pick up two electrons each. Being negatively charged, the projectiles are then pulled violently toward another aluminum screen which is positively charged. The particles are boosted to 500,000 volts by this charge.

## TECHNOLOGY

# Porcelain for Buildings

► THE SAME sort of porcelain enamel that gives refrigerators, stoves and washing machines their glossy appearance promises to become a major low-cost house and office building construction material, the Building Research Advisory Board in Washington reports.

Porcelain enamel panels now are being produced in a variety of colors and textures. They are suitable for exterior walls of buildings and houses, for flooring, decorative trimming and laboratory work benches.

Porcelain panels are not a substitute for regular load-bearing building materials, but they make high quality facing material. Attached to a strong building frame, the panels are exceptionally weather-resistant and are said to outlast the framework of the building itself.

The panels never have to be painted since color is an integral part of them. A quick washing will restore their snappy look when they become dirty.

Few office buildings and even fewer

As they rush through this screen, the fast particles tend to lose their two electrons. So on leaving this "stripping" foil, the particles are once again naked protons with a positive charge. They are violently pushed away from the foil, receiving another 500,000 volt boost.

Thus, with a single 500,000 volt charge, the protons are accelerated to 1,000,000 volts. The physicists get twice as much energy out of the machine as they put in. In larger versions of the machine, it will be possible to get 4,000,000 volt protons with an expenditure of 2,000,000 volts of energy. Four million electron volts is the energy range of a standard type Van de Graaff.

The idea of the "swindletron" was conceived independently by Dr. Luis W. Alvarez, professor of physics at Berkeley. After his publication of the idea, he learned that it had been patented in 1936 by Dr. Willard Bennett of the Naval Research Laboratory in Washington, although Dr. Bennett had never published a scientific paper on the subject. The small pilot model in Berkeley, the first of the "swindletron" species, is being developed by Dr. John R. Woodyard, professor of electrical engineering.

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a conference with porcelain enamel manufacturers at the National Academy of Sciences in Washington. The open meeting drew many persons engaged in the construction business. Various conference sessions brought out research and practical experiences that experts have had with the panels to date.

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## MEDICINE

# New Antibiotic Stops Viruses of 'Flu in Mice

► AN ANTIBIOTIC drug that can stop two human influenza viruses in mice was announced by Drs. D. A. Harris, H. B. Woodruff and Laurella McClelland of Merck and Co. Research Laboratories, Rahway, N. J., at the antibiotic symposium held under the sponsorship of the Food and Drug Administration, U. S. Department of Health, Education and Welfare.

The new antibiotic has been obtained in crystalline form from an organism called *Nocardia formica*.

Besides its "favorable" effect on mice infected with the human 'flu viruses, it enabled mice infected with swine influenza virus to survive twice as long as infected, untreated mice.

It also delays the development of mumps virus in eggs.

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## DENTISTRY

# Taste Governs Dentifrice Choice

► AMERICANS CHOOSE their dentifrice for its taste more often than for any other reason, it appears from replies of 3,000 families to a questionnaire by the American Dental Association.

Of 81.4% who answered the questionnaire, 18.5% said taste was the reason for selecting the dentifrice they used, with another 9% giving aftertaste as the reason. One out of 18 used a particular dentifrice because the dentist recommended it.

"A minority of respondents thought that ammoniated or chlorophyll dentifrice had an advantage over other dentifrices in the care of the teeth," the association reports.

The figures on this question show that 23.4% thought an ammoniated dentifrice best for teeth, 20.2% thought a chlorophyll dentifrice was best for the teeth, with 16.3% thinking a plain dentifrice was best, and 36.8% replying "It doesn't make much difference what kind is used."

Tooth paste is used by 69.1% of those answering the questionnaire, with 21.8% using tooth powder, and only eight-tenths of a percent using a liquid dentifrice. The others used soda, salt or some other dentifrice.

While 60.1% said they knew teeth should be brushed after each meal, only 29.1% said they actually did. The most common practice is twice-a-day brushing.

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## MEDICINE

# Arteriosclerosis Tendency

**Tendency toward artery hardening can be predicted by three comparatively simple laboratory tests, two of which measure the size of fatty particles in blood serum.**

► A TENDENCY to develop arteriosclerosis, or artery hardening, can be predicted by three "relatively simple" laboratory tests, Dr. Thaddeus D. Labecki of the Mississippi State Board of Health, Jackson, Miss., declared at the meeting of the American Society for the Study of Arteriosclerosis in Chicago.

This artery disease often leads to crippling and even fatal heart attacks. The tests, made on samples of blood and blood serum, reflect the body's efficiency in utilizing fatty substances.

Many factors, such as sex, age, high blood pressure and diabetes, contribute to development of arteriosclerosis and heart disease, Dr. Labecki explained. However, he pointed out, it is generally accepted that persons who develop disease of the heart arteries do not utilize fat in the proper manner.

Dr. Labecki's research is part of a long-range project planned to investigate in what ways the tendency to hardening of the heart's arteries reflects itself in certain substances circulating in the blood. These are the lipoproteins, that is, large molecules of fat combined with proteins.

"In certain individuals," he explained, "some of these particles deposit themselves in the lining of the arteries, particularly arteries leading the blood to the heart muscle itself (coronary arteries), and eventually the thickening which results from the deposition causes obstruction to the blood flow. If a vital coronary artery is

suddenly obstructed, a heart attack occurs which the patient may survive or which may result in instantaneous or subsequent death."

To determine how to find out whether a subject had a tendency toward, or actually had, arteriosclerosis, a group of 33 patients with coronary occlusion was compared with a group of 197 presumably normal patients.

In each of these reported cases, the performance of three tests, including two tests, ultracentrifuge and chylomicron determination, which so far have been limited predominantly to research centers, showed the disease could have been suspected in all patients, even if they failed to show definite clinical symptoms of the disease, Dr. Labecki reported.

Two of these tests measure the size of the fatty particles in the blood serum. The large particles, called chylomicrons, are large enough to be studied with the aid of a high-power, dark field microscope. The tiniest of the particles, lipoproteins, are too small to be seen, but can be studied through separation into several categories through the use of a centrifuge rotating about 55,000 times a minute.

The third test is based upon the determination of how much cholesterol, a fat substance excessive concentration of which has often been associated with arteriosclerosis, circulates in the patient's blood. This latter test has been long known to the medical profession.

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almost universally distributed, and evidence points to the air we breathe as their source.

"Until it can be explained why many persons who never smoke get lung cancer, or why more cases develop in air-polluted cities than in rural areas, or why there is less cancer of the larynx than of the lung which smoke reaches last," he declared, "smoking can be considered only as one possible source but not necessarily the principal offender."

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## BIOCHEMISTRY

## Cranberries Give Aid To Penicillin Effect

► A CHEMICAL from cranberries has been purified and converted into a compound that may prolong the effect of penicillin in the body.

The cranberry chemical is ursolic acid, found also in the shiny skins of other fruits such as apples. An amino derivative from it is the compound expected to prolong penicillin's effect, Prof. Lloyd M. Parks and Betty Y. T. Wu of the University of Wisconsin found in research aided by a grant from the National Cranberry Association.

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## TECHNOLOGY

## Devise Process for Reclaiming Asbestos

► SCIENTISTS AT the National Bureau of Standards have learned to reclaim critically short asbestos from discarded pipe insulation.

Working at the request of the Navy's Bureau of Ships, Elmer W. Zimmerman, a bureau chemist, discovered the asbestos can be reused if discarded pipe insulation is broken down with acids or alkalis to liberate the asbestos fibers from extraneous material.

Asbestos-cotton fabrics that do not contain paint can be treated with a five percent solution of hydrochloric acid, then rinsed. Fabrics painted on one side are boiled in a five percent solution of sodium hydroxide for 15 to 30 minutes. In both cases the fabric is rinsed, but in the latter case a detergent is added to remove paint pigment.

When cotton strands are mixed with the asbestos fibers, they can be "burned" out in a muffle furnace operating between 750 and 840 degrees Fahrenheit. Careful control must be exercised at this point to prevent the asbestos from becoming brittle due to a lack of moisture.

After the asbestos has been freed of its extraneous matter, the cloth is reduced to fiber in a rotary food blender or paper pulp beater and is ready to be worked into new insulation, paper and plastics. The recovered asbestos is unchanged chemically and its fibers shrink little, if any, during the recovery process.

Science News Letter, November 14, 1953

## MEDICINE

# Lung Cancer Increase

► POLLUTED AIR over our big cities is more to blame for the increase in lung cancer than tobacco smoking, Dr. Paul Kotin of the University of Southern California School of Medicine, Los Angeles, charged at the meeting of the American Cancer Society in New York.

Air-extracted aliphatic hydrocarbons and their oxidation products give signs of being concerned with tumor production in skin painting experiments with mice, Dr. Kotin's researches show.

In cooperation with the University of Southern California's School of Engineering, he studied the exhaust products of gasoline and diesel engines running at various speeds. Benzene extracts of materials caught on filter papers placed over the engine exhaust pipes produced skin tumors on approximately 50% of the mice on which

they were painted. Petroleum, natural gas and coal are the main sources of the air-polluting hydrocarbons. Previously, Dr. Kotin said, they have not been considered associated with tumor formation.

These same aliphatic hydrocarbons, their oxidation products and ozone cause a person's eyes to water on a smoggy day, and may be blamed for damage to the body's respiratory tract.

"We are creating a marked cancer hazard in the air over our big cities," Dr. Kotin said, "by dumping all manner of fumes and gases into the atmosphere."

"The increasing frequency of lung cancer in cities as compared with rural areas all over the world indicates that the atmosphere may be the principal cause of this disease. The agents responsible for the accelerated rate of lung cancer in man are



## MEDICINE

**Heal Bed Sores by Dried Blood Plasma**

► **ULCERATED BED** sores can be made to heal rapidly by putting on them a paste of dried blood plasma and Peruvian balsam, Drs. A. Bernice Clark and Howard A. Rusk of New York University College of Medicine report in the *Journal of the American Medical Association* (Oct. 31).

They tried the blood plasma paste with the thought that it would provide a nearly natural nutritional environment. The specific cause of ulcerated bed sores is not known but poor nutrition to the part is thought to be a major contributing factor.

The results with the dried blood plasma, however, suggested that it might also have an enzymatic action that dissolved dead and infected tissue. One long-standing ulcer with considerable necrotic tissue and infection was clean in 12 days, after the third dressing with the plasma paste.

Science News Letter, November 14, 1953

## DENTISTRY

**Antibiotic Fillings Help to Check Decay**

► **ADDING** A mixture of antibiotics to the fillings for cavities in teeth can help check further decay, it appears from studies reported by a dentist, Dr. Maxwell B. Colton, and a chemical engineer, Eugene Ehrlich, of New York, in the *Journal of the American Dental Association* (Nov.).

The antibiotics in the mixture tested were aureomycin, bacitracin, chloramphenicol and streptomycin.

Zinc cements, silicate cements and silver amalgam, they report, have some bacteria-killing effect and, therefore, play a part in preventing further decay. Adding the antibiotics increases this effect, and also gives germ-killing effect to direct filling resins that otherwise lack it.

Science News Letter, November 14, 1953

## ENTOMOLOGY

**Break Down of Muscle Ends Aphid Flying Days**

► **WINGED APHIDS** lose their ability to fly after a few days due to autolysis, or self-digestion of their flight muscles.

Scientists have observed before that winged aphids, or plant lice, seem to fly more during their first four days than during later periods. Bruce Johnson, an entomologist at the Rothamsted Experimental Station, has found that this is due to a breakdown of the flight muscles.

Autolysis of flight muscles has previously been found among ants and mosquitoes. In these insects, the nitrogen released during autolysis of the muscles is thought to be utilized for egg production. The similar condition among aphids also appears to be associated with reproduction, Mr. Johnson reported in *Nature* (Oct. 24).

Since they spread plant viruses during the few days of the flight period, aphids are economically important. The length of this period appears to be limited by the number of larvae laid by each aphid.

When reproduction was delayed, the flight period was correspondingly lengthened. After aphids have lost the ability to fly, they may live for as long as three weeks, producing one to four larvae each day.

Science News Letter, November 14, 1953

## PLANT PATHOLOGY

**Way Nicotine Forms In Plants Unknown**

► **ALTHOUGH MANY** millions of people every day smoke tobacco in which nicotine is an important ingredient, the way in which the tobacco plant makes chemically the nicotine in its leaves is still unknown scientifically.

Dr. K. Bowden of the department of organic chemistry, Leeds University, reported in *Nature* (Oct. 24) that the suggestion that nicotine is formed in the plant from the amino acid, tryptophane, has been tested and found wanting.

Formation of nicotinic acid from tryptophane in animals and microorganisms had been demonstrated two years ago. Dr. Bowden put a kind of tryptophane, which was radioactively tagged, into the soil in which the young tobacco plants were growing. The leaves did become radioactive, but the nicotine separated out from them showed no activity, indicating that the tryptophane molecule as a whole is not converted into nicotine.

Science News Letter, November 14, 1953

## MEDICINE

**Ringworm Remedy For Patchy Baldness**

► **THE KIND** of baldness that comes in sharply defined patches, known medically as alopecia areata, can be helped by a ringworm remedy, two Baltimore doctors announced at the meeting of the Southern Medical Association in Atlanta, Ga.

The doctors, H. M. Robinson Sr. and his son, R. C. V. Robinson, discovered the hair-growing capacity of the chemical more or less by accident.

The chemical is benzyl benzoate. They were using it on patients with ringworm of the scalp, trying to determine its value in this condition. They noticed a rapid growth of hair in the bald areas of the ringworm patients who were putting the chemical on their scalps. So they decided to try it in the patchy baldness that afflicts some people.

Of 40 patients followed for a year, 36 got good results with the benzyl benzoate treatments. This chemical proved superior to such other methods as liquefied phenol, ultraviolet light and ointments, and it also did not require too frequent visits to the doctor.

Science News Letter, November 14, 1953

**IN SCIENCE**

## PLANT PATHOLOGY

**Find Chemical Control For Virus X of Potatoes**

► **POTATO VIRUS X**, a widespread mosaic disease that stunts plants and reduces yields, can be controlled chemically with malachite green, Dr. D. Norris of Australia's Commonwealth Scientific and Industrial Research Organization at Canberra has reported.

Laboratory tests show malachite green, a diaminotriphenylmethane dye, reduces the virus X content in potato plants to a very low level.

At the present time, mosaic diseases are fought by developing resistant plant varieties and by destroying insects that transmit the viruses. A successful means of attack with chemicals has been sought throughout the world.

The general problem of plant virus control has been handicapped by lack of demonstration that there is a sufficient difference between the chemical processes of the virus and the host to make selective chemical therapy possible, Dr. Norris stated in *Nature* (Oct. 31).

In his tests, stems of potato plants were put in nutrient cultures, some being exposed to malachite green and the virus, and others only to the virus. All plants of the untreated series had a high content of virus X, while in the treated series, one plant was free of the virus and the others had only small amounts of virus.

Science News Letter, November 14, 1953

## NUTRITION

**Three Vitamins Needed For Disease Resistance**

► **FORMATION** OF disease-fighting antibodies seems to depend on getting plenty of three vitamins in the diet, Dr. A. E. Axelrod of Western Reserve University, Cleveland, reported at a symposium on protein metabolism at the University of Toronto, Canada.

The vitamins are pantothenic acid, folic acid and pyridoxine. When rats were on diets deficient in these, the antibodies circulating in their blood in response to injection of a foreign protein were "markedly decreased," Dr. Axelrod found.

The foreign protein in this case consisted of human red blood cells that should stimulate antibody formation in rats. Disease germs also should stimulate antibody formation. If further tests show that response to disease germs is blocked by lack of the vitamins, it will help to clear up the problem of the role of nutrition in resistance to disease.

Science News Letter, November 14, 1953



# NE FIELDS

## PHYSICS

### Soviet's "Different" Ice Proved Crystal "Ghost"

► A STRANGE sort of ice reported by a Soviet scientist in 1936 is being "melted" out of the scientific literature.

"Beta" ice, supposed to be different from the normal hexagonal crystals of ice, is now shown to be merely a sort of "ghost" of ordinary ice in X-ray crystallographic photographs. The verdict of "no evidence" to support the existence of this "beta" form of ice is given by Drs. Carl Berger and Charles M. Saffer Jr., Commonwealth Engineering Company of Ohio, Dayton, in *Science* (Oct. 30), who cite X-ray studies by Dr. Barbara W. Low.

Soviet scientist N. Seljakov reported the "beta" ice as crystals grown from water at air temperatures ranging from 5 to 16 degrees below zero Centigrade, 23 to 2 degrees Fahrenheit. The American scientists grew ice crystals under these conditions, and demonstrated that the X-ray crystal pattern found by the Soviet scientist was obtained with ordinary ice when the crystals were set in the apparatus at a slight angle.

*Science News Letter, November 14, 1953*

## BIOCHEMISTRY

### New Vision Chemical May Help to See Red

► CREATION OF a new vision chemical for daylight seeing which may even be the red-seeing chemical of the eyes is announced by Drs. George Wald, Paul K. Brown and Patricia H. Smith of Harvard University.

The chemical is a light-sensitive, blue substance called cyanopsin. It has not yet been extracted from any eye retina. However, it could be expected to exist in the eyes of freshwater fish, or any eyes that contain a special form of vitamin A and two other vision chemicals, retinene 2 and cone opsin. Cone opsin comes from the cones, which are the cells of the eyes that operate in daylight.

Dr. Wald and his associates made the new vision chemical, cyanopsin, from an extract of dark-adapted rods and cones from chicken eye retinas. The extract contains a mixture of two chemicals, rhodopsin and iodopsin, they report in *Science* (Oct. 30).

Deep red light was used to bleach the iodopsin to a mixture of all trans retinene 2 and cone opsin. To this they added a small amount of the specific cis isomer of retinene 2. In this way, cyanopsin is synthesized within five minutes in the dark at room temperature.

The new pigment plays a part in the daylight seeing of fresh water fish, tortoises

and American turtles, the Harvard scientists believe, because, even though it has not been extracted from any eyes, the eyes of these animals contain the chemicals necessary for its formation.

Because cyanopsin absorbs light waves far into the red part of the spectrum, Dr. Wald suspects that it may be the eye chemical with which the color red is seen. It is the first eye pigment that could serve in a "red receptor," he states.

With two other previously known visual pigments, rhodopsin and iodopsin, it might form the basis for a system of three-color vision. But so far, Dr. Wald says, there is no evidence for this.

*Science News Letter, November 14, 1953*

## SURGERY

### Suicide Danger in Plastic Surgery Delay

► CANCER PATIENTS who have had one-third to one-half of the face cut away may go into a profound depression and even commit suicide unless the surgeon immediately outlines hopeful plans for reconstruction, Drs. J. J. Longacre, John Leichter and Paul Jolly of Cincinnati warned at the meeting of the American Society of Plastic and Reconstructive Surgery in San Diego, Calif.

The reconstruction can be started six months to a year after the original operation when the surgeon is sure all cancerous tissue has been cut out. When repair will be extensive, the first stage can be started even earlier, thus encouraging the patient.

"It is not delayed treatment, but putting treatment that seems to lessen the quality of results," Dr. Longacre declared. Less than four percent of the cancers recurred in the cases he described, although three out of every five patients had had recurrences following earlier treatment by X-ray, radium and less radical surgery.

When reconstruction was complete, he said, the patients returned to their jobs and resumed their former roles in the community.

*Science News Letter, November 14, 1953*

## GENERAL SCIENCE

### Defense Efforts Curtail Other Scientific Research

► THE MAN-HOURS and man-years of research the chemical industry's limited number of technical experts are devoting to national defense represent an unavoidable delay in the achievement of constructive goals by applied chemistry, Charles S. Munson, chairman of the board of Air Reduction Company, Inc., said in accepting the 1953 Society of Chemical Industry Medal in New York.

"Perhaps the chemist who has developed a new rocket fuel to power a guided missile with an atomic warhead is the very man who might otherwise have discovered a polio vaccine a few years ago," he said.

*Science News Letter, November 14, 1953*

## MEDICINE

### Ultrasonic Treatment Helps Bursitis Patients

► RESULTS OF more than 3,000 treatments with ultrasonics, or high frequency sound waves that cannot be heard by human ears, given to 300 patients were announced by Dr. Ferdinand F. Schwartz of Birmingham, Ala., at the meeting of the Southern Medical Association in Atlanta, Ga.

Patients who were helped were those with osteoarthritis, neuritis, varicose ulcers, sprains, and bursitis with or without lime deposits. Most of the bursitis patients got relief after the second or third "sounding," as the ultrasonic treatments are called.

This treatment requires experience and great care, Dr. Schwartz stressed. The method is still so new that no definite dosage, time element or signs for its use have been established.

*Science News Letter, November 14, 1953*

## SURGERY

### Birth Wasted Tissue To Cover Large Wounds

► AFTER-BIRTH TISSUES, normally thrown away after a baby is born, may be converted into temporary coverings for large burns and other big wounds, if experiments live up to present promise.

The experiments were reported by Dr. Beverly Douglas of Vanderbilt University, Nashville, Tenn., and Drs. Herbert Conway, Richard B. Stark, Doyle Joslin and Guillermo Nieto-Cano of New York Hospital-Cornell Medical Center, New York, at the meeting of the American Society of Plastic and Reconstructive Surgery in San Diego, Calif.

Three human burn victims have already had such after-birth tissues transplanted to protect the surface of their wounds, Dr. Douglas reported. These transplants survived for three weeks.

In mouse experiments, Dr. Conway and the Cornell group found that 18 human membranes transplanted to open wounds on the mice survived an average of 12 days. Transplants of mouse membranes to mice lasted even longer. This compares with five and a half days for survival of skin grafts that are sometimes used to cover large wounds and burns.

Such wounds need fast covering by skin or other tissues to prevent death from loss of fluids, salts and blood elements.

The after-birth membranes are readily available in large amounts in the maternity wing of any hospital, the doctors pointed out.

Skin grafts from dead donors, available through a bank of such skin, for covering large wounds were reported as another solution to the problem by Dr. James Barrett Brown of Washington University School of Medicine, St. Louis, at the American College of Surgeons meeting in October.

*Science News Letter, November 14, 1953*

## AERONAUTICS

# Aviation's Next 50 Years

In its first 50 years, aviation has grown from an infant into vibrant manhood. What lies ahead? The sonic barrier was spectacular, but the thermal barrier is deadly.

By ALLEN LONG

► IN ITS first half-century, aviation has grown from an infant into vibrant manhood. Whereas the Wright brothers' first successful powered airplane struggled to get off the ground to fly those historic 120 feet, today's modern jet bomber flexes eight mighty engines and roars into the blue pushed by hundreds of thousands of horsepower.

What lies ahead of this thriving industry? What will its status be 50 years hence when the airplane becomes a centenarian?

Some of the boldest experts decline to predict. Aviation already has far surpassed the wildest dreams of 1903's most outspoken experts. It could do so again.

But it may not. The industry may be approaching technological bottlenecks.

Cracking the sound barrier was heralded as a major accomplishment in aviation. But a much more formidable barrier looms at the horizon. It is the so-called "thermal barrier." It is the heat created by air friction when a supersonic plane cuts through the sky. It is capable of melting the airplane and broiling the pilot.

## Approaching Thermal Barrier

Already the thermal barrier is a serious problem. Refrigerating systems are being built into test planes to keep their pilots alive. But refrigerating systems, some of them big enough to air-condition whole theaters, are heavy and impose severe aerodynamic penalties upon the plane.

At Mach 3, when the plane or guided missile is flying three times as fast as the speed of sound, aluminum begins losing its strength due to the heat. Hope, however, is offered by such metals as titanium and stainless steel. These metals combine excellent heat resistance with lightness and strength.

Improvements in jet engines have yielded great economies. They probably will be made even better in the next 50 years. But generally speaking, the efficiency of turbojet engines depends somewhat upon their operating temperatures. Materials must be developed that can withstand the terrific temperatures inside these airborne blast furnaces. Ceramic linings seem to offer some promise.

With the development of hotter-operating jet engines, metallurgists will have to create metal parts to work in the heat thrown off by the engine flame. Gears must mesh without melting. Shafts must spin without bowing.

The advance of aviation is not wholly dependent upon dreamy-eyed aeronautical engineers. The visions of these men are given substance by steady progress made in allied fields. For instance:

Today's planes are flying at altitudes far higher than once were thought at all possible. At these heights, ordinary oils fail to lubricate the engines. Instead, the oils boil off, leaving the mechanism unprotected.

However, as it became apparent that this problem was arising, petroleum technologists worked out synthetic oils to do a better lubricating job over a wider range of temperatures and altitudes. The synthetics have been designed to stick with the engine and not evaporate into the thin, almost non-existent air 40 miles above the earth's surface.

The petroleum engineer met the challenge. But will he always be able to turn up an answer to the aeronautical engineer's problems? Will other scientists be able to keep pace?

Out of the scientists' laboratory comes the eyes of today's pilot. Out of his laboratory comes the hands and feet of the pilot. Out of his laboratory comes the brains of the pilot.

Man already is outmoded in many cases. His muscles are far too puny to pull a supersonic plane out of a dive without the aid of powerful little motors. His eyes are bound by haze, cloudiness and darkness to

a narrow "operating range." Radar is required to offset that.

His mind, already jammed to the bursting point with things to remember, must be supplemented by automatic controls that fly his plane with reflexes keyed thousands of times more highly than those of the best athlete.

Will science be able to continue offsetting each human handicap with a mechanical advantage? Perhaps some intimation of the answer to this question may be obtained when the Air Force's new jet interceptor, the F-102, is examined.

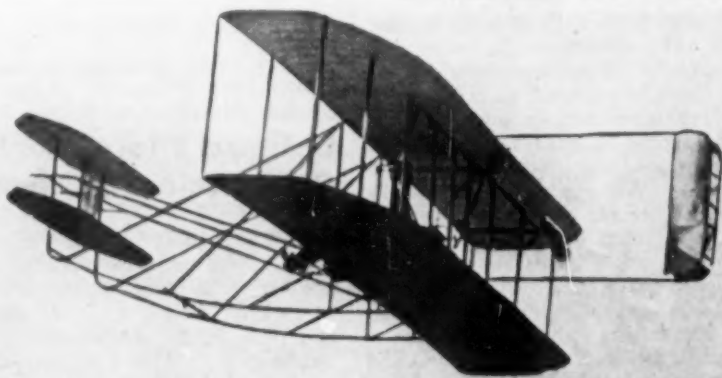
In operation, this plane is largely controlled by instruments. The pilot handles the plane only at take-off and landing. After take-off, the pilot flips a switch and a man on the ground flies the plane by remote control to the vicinity of the target. Then the pilot flips another switch and instruments in the plane take over.

The instruments search out and track the target. They guide the plane as it stalks its prey. Instruments even fire the plane's weapons at the proper time. Then, mission accomplished, the pilot flips the switch and his ground-based co-pilot flies the plane back to the landing field.

All of this in 50 years! But despite the fantastic headway aeronautical engineers have made in the last half-century, the next 50 years of aviation may be the greatest.

In 2003, someone may come across this article and smile, knowing that the "vibrant manhood" of aviation, to which this writer refers, merely was the time when the infant took its first wobbly step.

Orville and Wilbur Wright made headlines that cold Dec. 17, 1903, when their



**THE OLD**—This "Wright Flyer" was the latest thing in aviation when the picture was snapped in 1908. It had carried the first Army passenger into the sky only three days before.





**THE NEW**—This photo is the first showing the Air Force's glittering Super-Sabre, the North American F-100. The first production model, which can fly faster than the speed of sound, has a combat radius of over 500 miles.

plane zoomed into the sky, flying 120 feet in 12 seconds. Three tries later, the plane flew 852 feet in 59 seconds. Other aviation pioneers still are making headlines.

A 37-year-old Marine Corps pilot, Lieut. Col. Marion E. Carl, recently climbed to a breath-taking and record-setting height of 83,235 feet over California's Muroc Dry Lake. This shattered the altitude record previously held by Bill Bridgeman, test pilot for the Douglas Aircraft Company. But Bill still has flown faster than any other person. He swished through the sky at 1,238 miles an hour in an experimental plane last year.

Sir Miles Thomas, chairman of the British Overseas Airways Corporation, recently revealed that British aircraft designers are working on bigger and better jetliners to whisk passengers anywhere in the world within 24 hours. He said the planes will carry about 100 persons and will be able to hop from London to Australia in a day.

He also revealed that British engineers are planning an atomic-powered flying boat that can carry 200 passengers. Engineers estimate the plane will weigh 250 tons, but will be economical because it will not have to sacrifice passenger revenue to fuel.

Sir Roy Dobson, managing director of A. V. Roe and Company, predicted atomic-powered planes will be in the air within 25 years.

In the United States, work on future atomic-powered planes is progressing quietly. The Consolidated Vultee Aircraft Corporation, Boeing Airplane Company and Lockheed Aircraft Corporation all are working on the airframe design. Pratt and Whitney Aircraft Company and the General Electric Company are attempting to work out the nuclear engine.

Today the world teeters on the edge of space travel. Rocket experts are beginning to talk about space platforms, rocket ships and interplanetary voyages. Will the first

rocket ship streak to the moon within the next 50 years?

It may, but many problems must be solved first. Gen. James H. Doolittle recently pointed out that a ballistic missile traveling about 20 times the speed of sound would generate temperatures of about 15,000 degrees Fahrenheit. This, he said, is far higher than any sustained temperature ever achieved on earth except in an atom bomb. No known material can withstand such heat.

Some material, however, will have to be developed if an earth-launched missile is to reach outer space. This is because the missile must travel about 20 times the speed of sound to escape from the tentacles of the earth's gravity.

Perhaps these problems seem overpowering at the moment. But it must be remembered that the problems of 1903 were even more baffling, for no one ever had made an engine-powered airplane that flew.

Yet in 50 years, aviation has run the gamut from gliders to intercontinental bombers. The future could be just as startling.

Science News Letter, November 14, 1953

#### ASTRONOMY

### New Comet Faint And Short Tailed

➤ A FAINT new comet has been sighted not far from the pole star in observations at Palomar Observatory in California.

The new comet will be known as Abell Comet after its discoverer, George Abell.

The object is of the 15th magnitude and it has a very short tail. What will happen to this new object can not be told until other astronomers have observed it for a short time and its orbit can be computed.

Science News Letter, November 14, 1953

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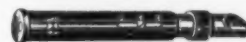
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# Books of the Week

For the editorial information of our readers, books received for review since last week's issue are listed. For convenient purchase of any U. S. book in print, send a remittance to cover retail price (postage will be paid) to Book Department, Science Service, 1719 N Street, N. W., Washington 6, D. C. Request free publications direct from publisher, not from Science Service.

**ALL ABOUT DINOSAURS**—Roy Chapman Andrews—*Random House*, 146 p., illus., \$1.95. Dinosaurs, the author assures us, were the strangest animals that ever existed on this earth. They all died out at the end of the Age of Reptiles, some 60,000,000 years ago.

**ALL ABOUT RADIO AND TELEVISION**—Jack Gould—*Random House*, 143 p., illus., .95. Directed to boys and girls between the ages of 9 and 12.

**ALL ABOUT THE SEA**—Ferdinand C. Lane—*Random House*, 148 p., illus., \$1.95. Telling young people how the sea was formed, of the mountains under the ocean depths, life under the waters and the wealth that can be mined from sea water.

**ALL ABOUT VOLCANOES AND EARTHQUAKES**—Frederick H. Pough—*Random House*, 150 p., illus., \$1.95. The author is the expert who was sent by the American Museum of Natural History to observe the growth of the new volcano, Paricutin, in Mexico. Here he tells what scientists know about the reasons for earthquakes and volcanic eruptions.

**ALL ABOUT THE WEATHER**—Ivan Ray Tannehill—*Random House*, 148 p., illus., \$1.95. A senior meteorologist of the U. S. Weather Bureau explains for young people how to observe

the weather and how forecasts are made. Charming illustrations by Rene Martin.

**AN APPRAISAL OF THE UNITED NATIONS EDUCATIONAL, SCIENTIFIC AND CULTURAL ORGANIZATION**—Irving Salomon, Chairman, and other delegates—U. S. Department of State, 18 p., paper, small quantities free upon request to publisher, Washington 25, D. C. Considering the criticisms and accusations against UNESCO that have arisen in the United States, and providing facts to answer them.

**BACTERIOLOGICAL ASPECTS OF BITUMINOUS COAL MINE EFFLUENTS**—William W. Leathen—*McLennan Institute*, 8 p., illus., paper, free upon request to publisher, 4400 Fifth Avenue, Pittsburgh 13, Pa. Acid bituminous coal mine effluents, along with industrial wastes, constitute a major problem in Pennsylvania.

**CHRISTMAS IDEA BOOK**—Dorothy Biddle and Dorothea Blom—*Barrows*, 221 p., illus., \$3.50. How to decorate your home, table, doorway, gifts and tree to make the holiday more festive.

**DESIGN FOR DECISION**—Irwin D. J. Bross—*Macmillan*, 276 p., \$4.25. Describing in simple terms the process known as "statistical decision." Suggestions are made for further and more technical reading.

**DOCTOR PYGMALION: The Autobiography of a Plastic Surgeon**—Maxwell Maltz—*Crowell*, 261 p., \$3.50. The story of a surgeon who could save his patients from the tragedy of scarred, ugly faces and give them new, normal lives.

**DOCTORS, PEOPLE, AND GOVERNMENT**—James Howard Means—*Little, Brown*, 206 p., \$3.50. Attacking the problem of how to improve the nation's medical service.

**ELEMENTARY QUANTITATIVE ANALYSIS**—Ralph L. Van Peursem and Homer C. Imes—*McGraw-Hill*, 383 p., illus., \$4.50. Textbook for pre-medical and preengineering as well as chemistry students.

**HIGH FIDELITY TECHNIQUES**—John H. Newitt—*Rinehart*, 494 p., illus., \$7.50. High fidelity sound reproduction has recently made tremendous strides, the author explains, and these advances do not necessarily involve great expense. This book is for the engineer and serviceman,

but also for the man who likes to "build his own."

**HOW CHILDREN LEARN TO WRITE**—Helen K. Mackintosh and Wilhelmina Hill—*Govt. Printing Office*, Office of Education Bulletin 1953, No. 2, 24 p., illus., paper, 15 cents. Children learn to write by writing. Teachers will learn here how to present opportunities for writing that has a real purpose.

**HOW TO LIVE WITH YOUR TEEN-AGER**—Dorothy W. Baruch—*McGraw-Hill*, 261 p., illus., \$3.75. Addressed to perplexed parents by a psychologist, this book contains the reassurance that the "blame for everything big and small does not have to rest on your shoulders."

**THE IROQUOIS EAGLE DANCE AN OFFSHOOT OF THE CALUMET DANCE**—William N. Fenton—*AN ANALYSIS OF THE IROQUOIS EAGLE DANCE AND SONGS*—Gertrude Prokosch Kurath—*Govt. Printing Office*, 324 p., illus., paper, \$1.50. The ritual of the dance varies locally in detail, but everywhere there is an underlying pattern which sets limits to the expression of individual personality.

**THE JOURNALS OF LEWIS AND CLARK**—Bernard DeVoto, Ed.—*Houghton Mifflin*, 504 p., illus., \$6.50. An important narrative of North American exploration. The editor has chosen for reproduction here about one-third of the original manuscript.

**MAN, TIME, AND FOSSILS: The Story of Evolution**—Ruth Moore—*Knopf*, 411 p., illus., \$5.75. A companion volume to "Gods, Graves and Scholars," this book tells the story of man's evolution as revealed by the research and discoveries of recent years.

**PRAPMA: A Primer of Public Relations for the Pharmaceutical Industry**—Public Relations Committee APMA—*American Pharmaceutical Manufacturers' Association*, 90 p., illus., \$4.50. Public relations, for the drug manufacturer, involves letting the public know about his products without raising false hopes.

**PARKING AS A FACTOR IN BUSINESS: Part 2, Economic Relationships of Parking to Business in Seattle Metropolitan Area**—Louis C. Wagner—*Highway Research Board*, 37 p., illus., paper, \$1.35. The downtown business district is still handling as much business from shoppers, but it is losing out to suburban centers in relative importance.

**PHILOSOPHICO-SCIENTIFIC PROBLEMS**—P. Henry Van Laer, Translated by Henry J. Koren—*Duquesne University Press*, 168 p., paper \$2.50, (See p. 318)

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## Books of the Week from page 316

cloth \$3.25. Discussion of a number of philosophical problems in the light of modern scientific data.

**PREMATURITY, CONGENITAL MALFORMATION AND BIRTH INJURY**—L. Emmett Holt, Jr., Theodore H. Ingalls and Louis B. Hellman, Co-Chairmen—*Association for the Aid of Crippled Children*, 255 p., illus., \$4.00. Proceedings of a conference to which more than thirty specialists in this field contributed.

**PRIMITIVE HERITAGE: An Anthropological Anthology**—Margaret Mead and Nicolas Calas, Eds.—*Random House*, 592 p., \$5.00. Bringing together the writings of anthropologists that "would restore the sense of wonder earlier generations drew from accounts of primitive and exotic men."

**RECRUITING THE COLLEGE GRADUATE: A Guide for Company Interviewers**—Richard S. Uhrbrock—*American Management Association*, 31 p., paper, \$1.25. Now that demand for talent exceeds the supply, company interviewers will welcome this step-by-step guide for picking the best men.

**SOIL AND FERTILIZER PHOSPHORUS IN CROP NUTRITION: Volume IV of AGRONOMY**—W. H. Pierre and A. G. Norman, Eds.—*Academic Press*, 492 p., illus., \$9.00. A critical analysis of the present state of knowledge, needed in this rapidly advancing field. Contributed by a number of specialists.

**SYNOPSIS OF MEDICAL PARASITOLOGY**—V. E. Brown — V. E. Brown, 109 p., illus., paper, \$3.50. Intended as a reference manual for students' use in the laboratory.

**THE THEORY OF METALS**—A. H. Wilson—

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*Cambridge University Press*, 2nd ed., 346 p., illus., \$8.50. The author has attempted to introduce all important physical principles and to give application which are of wide interest.

**TELEVISION RECEIVER DESIGN: Monograph 2, Flywheel Synchronization of Saw-Tooth Generators**—P. A. Neeteson—*Philips' Technical Library (Elsevier)*, 156 p., illus., \$4.50. Television engineering demands more than the application of radio experience; television receivers embody new developments in circuit design and the use of electronic tubes.

**UNDERSTANDING BOYS**—Clarence G. Moser—*Association Press*, 190 p., illus., \$2.50. Written by a child guidance specialist for adults.

**UNESCO FACTS—U. S. National Commission for UNESCO**, 16 p., illus., paper, small quantities free upon request to publisher, Department of State, Washington 25, D. C. Facts about the objectives and accomplishments of UNESCO and why the U. S. Government participates.

**VAGRANT VIKING: My Life and Adventures**—Peter Freuchen, translated from the Danish by Johan Hambro—*Messner*, 422 p., illus., \$5.00. An Arctic explorer tells the story of his adventurous life.

**VOCABULARIUM BIBLIOTHECARIUM**—Begun by Henri Lemaitre, revised and enlarged by Anthony Thompson—*UNESCO (Columbia University Press)*, 296 p., paper, \$1.75. Common terms used by librarians, such as "complete works," "detective story," "fiction" and so on, with the equivalents in French and German.

**WHAT CHIEF STATE SCHOOL OFFICERS SAY ABOUT HIGH SCHOOL DRIVER EDUCATION**—*American Automobile Association*, 20 p., illus., paper, single copies free upon request to publisher, 1712 G Street, N.W., Washington, D. C. High school driver education reduces accidents by 50% or more, although only a fourth of high schools offer this driver training.

**WITHIN THE LIVING PLANT: An Introduction to Plant Physiology**—Erston V. Miller—*Blakiston*, 325 p., illus., \$5.00. Based on the author's plant physiology course at the University of Pittsburgh.

**WORLD MEDICAL PERIODICALS**—Joint Committee of UNESCO and WHO—*WHO-UNESCO (Columbia University Press)*, 237 p., \$2.00. Listing 4,000 periodicals with place of publication and language. A subject index is included.  
*Science News Letter*, November 14, 1953

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► **LIVING THINGS** use a wide variety of means in defeating or evading the deadly blight of winter! Plants, in general, have the hardest time of it.

Lower forms, being mostly aquatic, keep refuge in the water, as fish do, and stolidly stick it out. Water seldom freezes all the way to the bottom. Some of these pond inhabitants, at that, produce desistant spores in autumn, that fall to the bottom and lie dormant until spring.

Higher plants either trust the fate of coming generations to their seed and submit to being frozen to death, as the annual herbs do, or crouch beneath coverings of dead leaves and drifted snow, or even retreat into bulbs, rootstocks, etc., leaving no parts exposed above the surface. Trees, shrubs and woody vines either shed their leaves and stand as skeletons through the bitter season, or cling stubbornly to close-reefed evergreen foliage, and wrestle it out with the storms.

Animals, being motile for the most part, have a wider choice. Some, like short-lived insects, entrust the fate of the species to eggs or pupae, as annual plants do to seeds, and make no attempt to live through the winter. Others, notably birds, frankly run away, migrating southward in vast flocks as winter moves down the map, to return north with spring.

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Many hibernate; and there are all degrees of hibernation. Some, like ground squirrels and frogs, pass into a "death-seeming swoon," from which it is extremely difficult to arouse them without warming them up to springtime temperature. Others, like bears and some species of squirrels, sleep deeply or lightly, as particular environmental conditions dictate. Some bears go into their dens in autumn and are not seen again until spring. Others emerge during thaws and forage for a little extra food to supplement their stored fat. In the South, of course, bears do not hibernate at all.

Many animals, like hawks and owls, chickadees and nuthatches, the fox, wolf and weasel tribes, rabbits and quite a number of rodents, are able to find enough food to keep their life-fires going full blast all winter, especially since the majority of them are able to make or find warm shelter of some kind.

Science News Letter, November 14, 1953

An inch-square bar of a new titanium alloy containing aluminum and tin can withstand a pulling force of 110,000 pounds.

Hydrogen peroxide seems to wear out, though kept in a tightly closed bottle, because its extra oxygen atom is easily detached, producing oxygen and water.

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## ORNITHOLOGY

### New Birds Discovered In Arabian Sultanate

► A NEW babbler, lark and warbler were discovered by an expedition of the Academy of Natural Sciences of Philadelphia to the Arabian Sultanate of Muscat and Oman.

William K. Carpenter headed the expedition to the independent Arab state which covers an 800-mile strip of coastline fronting on the Gulf of Oman and the Arabian Sea.

The new lark was named *Ammomanes deserti taimuri*, Muscat Desert Lark, in honor of Sultan Said bin Taimur of Muscat and Oman. Carpenter's Streaked Wren Warbler, *Prinia gracilis carpenteri*, was named for Mr. Carpenter. *Turdoides squamiceps muscatensis*, Muscat Brown Babbler, was the third subspecies discovered.

The lark is an exceptionally dull-colored, grayish race of desert larks. The Muscat Babbler has a shorter bill, wing and tail than its closest relatives and is less brownish in color. The new warbler has fine markings and is somewhat larger than similar birds found in India.

Complete descriptions of the new subspecies have been published by the Academy of Natural Sciences.

Science News Letter, November 14, 1953

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## Questions

DENTISTRY—What is effect of adding antibiotics to tooth fillings? p. 312.

□ □ □

GENERAL SCIENCE—How does the defense effort curtail other research? p. 313.

□ □ □

INVENTION—How many patent copies are requested per day, on the average, at the Patent Office? p. 308.

□ □ □

METEOROLOGY—What are the advantages of numerical forecasting over present methods? p. 309.

□ □ □

PHYSICS—Why is the "swindletron" so named? p. 310.

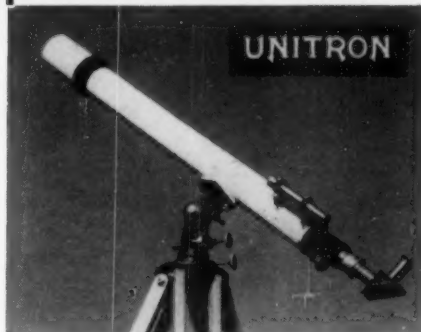
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❁ **CURTAIN WALL** panels made of cellular glass covered with porcelain enamel now are available. Designed for non-load-bearing walls, the panels combine good insulating qualities with attractiveness. Now being used in a Missouri grade school, the panels are lightweight, vermin-proof, long-lived, fireproof and dimensionally stable.

Science News Letter, November 14, 1953

❁ **LAPPING MACHINE** is said to produce close-tolerance finishes on metals, glass, quartz, plastic and other materials. The machine features a 24-inch diameter cast-iron lapping plate two inches thick, revolving on ball bearings at a working height of 38 inches.

Science News Letter, November 14, 1953

❁ **"CLIMATIC PAD"** is inserted under the pillowcase to warm up the cloth on nippy winter nights. An electric pump, placed on the floor, quietly circulates warm water through the plastic tubing of the pad in the winter or cool water in the summer.

Science News Letter, November 14, 1953

❁ **THERMOSTAT HAS** been redesigned to blend with household walls to present a



pleasing appearance. Semi-spherical in shape, the thermostat's outer shell can be painted or wallpapered to match the walls. The thermostat, shown in the photograph, is 3.5 inches in diameter.

Science News Letter, November 14, 1953

❁ **BABY DISH** set is made of a rugged cellulose acetate plastic. The cup has a round, weighted bottom which turns the cup upright if it is knocked over. The cup's lid, which has a sip-hole, cuts down spillage. The dish has a three-inch suction cup on its bottom to attach it firmly to the high chair tray.

Science News Letter, November 14, 1953

❁ **NEW "RUBBER adhesive"** is a black, fluid cement that "sticks rubber to anything," the maker reports. The cement is said to produce a strong, flexible, long-lasting bond, and is good for attaching rubber weather stripping to auto windshields and trunk lids, for re-securing rubber floor mats, stair treads, tile blocks and for mending rubber boots.

Science News Letter, November 14, 1953

❁ **RAIN SKIRT** wraps around milady's waist to ward off rain droplets that get past her umbrella. Useful while grooming pets, working in photographic darkrooms, or boating, the skirt is made of a transparent vinyl plastic film.

Science News Letter, November 14, 1953

❁ **SEALER FINISH** for knotty pine and other natural woods used in the home consists of synthetic plasticized resins mixed with a quick-drying gum base. Sprayed or brushed directly on the wood, the finish maintains surface protection for at least five years, the manufacturer reports.

Science News Letter, November 14, 1953

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Concrete building blocks must stand 900 pounds per square inch pressure; recent tests of a fly-ash block showed it could take 1,285 pounds.

About 1,800 different jobs are required to extract oil from the ground and get it to the consumer.

Cow's milk and human milk have equivalent caloric values, but cow's milk contains more protein and minerals.

Automobile accidents have injured 26 citizens for each American serviceman wounded in all the wars ever fought by the U. S.